KASSIRSKIY, I.A., professor, zasluzhennyy deyatel' nauki; VAYSBERG,
    G. Ye., kandidat meditsinskikh nauk; ASKAROV, U.A., (Moskva)

Toxicoallergic effects of antibiotics and their effect on
the hemopoietic system. Klin.med.33 no.7:8-18 Jl '55(MIRA 8:12)
    (ANTIBIOTICS, injurious effects,
        hemopoietic allergic reactions)
    (HEMOPOIETIC SYSTEM, effect of drugs on,
        antibiotics, allergic reactions)
    (ALLERGY,
        to antibiotics)

ASKAROV, U.A.

USSR/Pharmacology. Toxicology. Chemo-Therapeutical Prepa-   U-7
rations.

Abs Jour : Ref Zhur-Biol., No 7, 1958, 33044

Author   : Kassirskiy I. A., Vaysberg G. E. Askarov U. A.
Inst   : Not given
Title   : Reaction on Application of Antibiotics.

Orig Pub : V. sb.;antibiotiki. Eksperim.-clinich. izuch.
            M., 1956, 291-303

Abstract : The intramuscular administration of penicillin
            in a dose of 100 to 400 thousand units every 24
            hours produced a cutaneous reaction in 12 pa-
            tients out of a 1.000. Therapy of 111 patients
            with biomycin produced nausea in 16 of the pa-
            tients, womiting in 8, glossitis in 4, pains in
            the epigastric area in 2, and diarrhea in 1. Of
            145 patients treated with streptomycin 5 were

Card 1/2

.USSR/Pharmacology. Toxicology. Chemo-Therapeutical Prepa-   U-7
            rations.

Abs Jour : Ref Zhur-Biol., No 7, 1958, 33044

Abstract : afflicted with temporary leukopenia. Penicillin
            was found to be the least toxic of the anti-
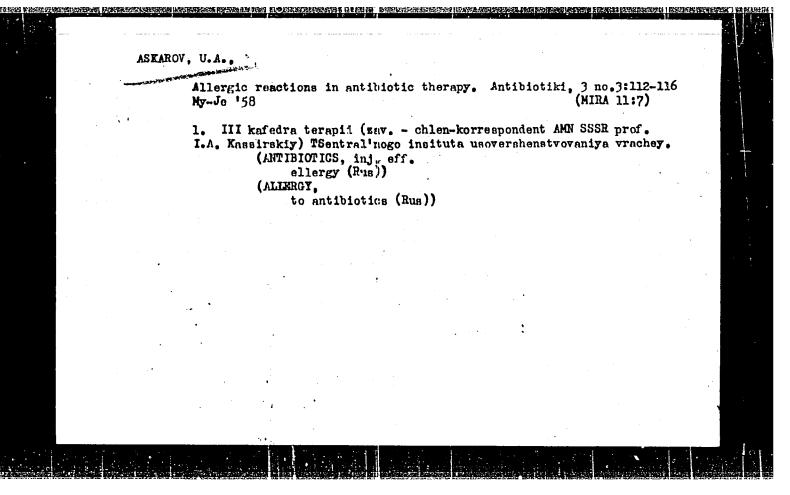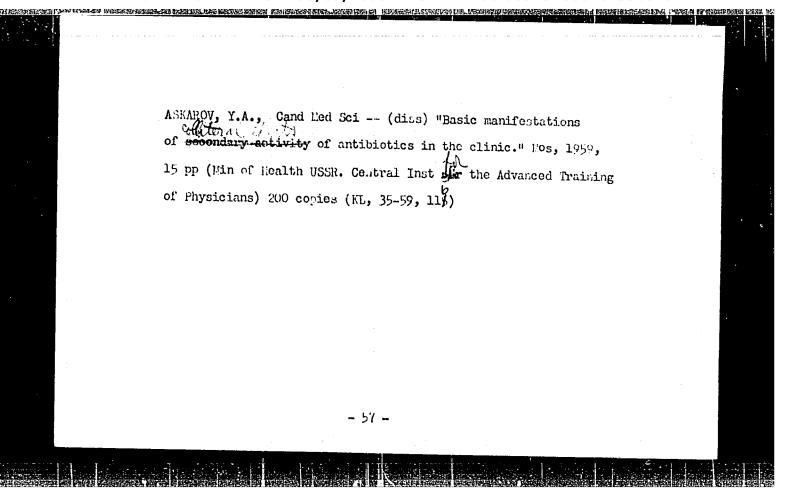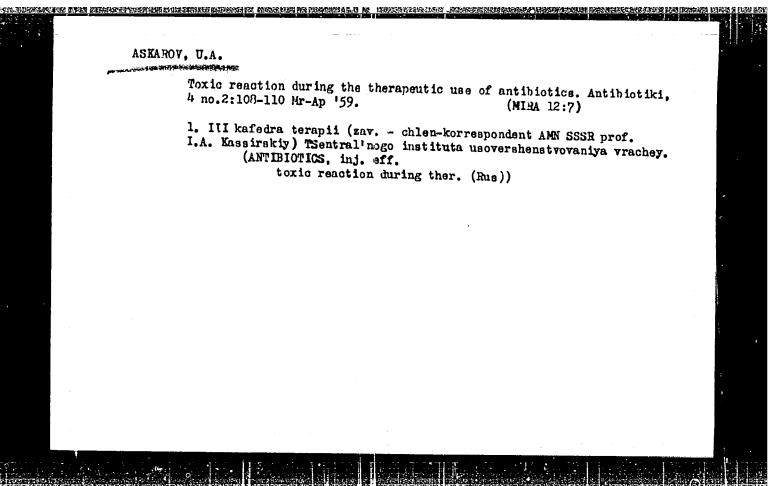   biotics.

Card 2/2

ASKAROV, U.A.; KASSIRSKIY, I.A. (Prof.); VAYSBERG, G. Ye. (Cand. of Med. Sci.)

"Secondary Reactions as a Consequence of Administration of Antibiotics,"

p. 291 Ministry of Health USSR Proceedings of the Second All-Union Conference on Antibiotics, 31 May - 9 June 1957. p. 405, Moscow, Medgiz, 1957.

ASKAROV, U.A.,

Allergic reactions in antibiotic therapy. Antibiotiki, 3 no.3:112-116
My-Je '58   (MIRA 11:7)

1. III kafedra terapii (zav. - chlen-korrespondent AMN SSSR prof.
I.A. Kasairskiy) TSentral'nogo insituta usovershenstvovaniya vrachey.
        (ANTIBIOTICS, inj. eff.
            ellergy (Rus))
        (ALLERGY,
            to antibiotics (Rus))

ASKAROV, Y.A., Cand Med Sci -- (diss) "Basic manifestations
of secondary activity of antibiotics in the clinic." Mos, 1959,

15 pp (Min of Health USSR. Central Inst for the Advanced Training

of Physicians) 200 copies (KL, 35-59, 118)

- 57 -

ASKAROV, U.A.

Toxic reaction during the therapeutic use of antibiotics. Antibiotiki,
4 no.2:108-110 Mr-Ap '59.   (MIRA 12:7)

1. III kafedra terapii (zav. - chlen-korrespondent AMN SSSR prof.
I.A. Kassirskiy) TSentral'nogo instituta usovershenstvovaniya vrachey.
        (ANTIBIOTICS, inj. eff.
            toxic reaction during ther. (Rus))

ASKAROV, U.A. (Moskva)

Main clinical manifestations of the side-effects of antibiotics.
Terap.arkh. 31 no.7:32-43 Jl '59.   (MIRA 12:11)

1. Iz 3-y kafedry terapii (zav. - chlen-korrespondent AMN SSSR
prof.I.A.Kassirskiy) TSentral'nogo instituta usovershenstvovaniya
vrachey.
                (ANTIBIOTICS effects, injurious)

ASKAROV, U.A.; LYUBECHANSKAYA, N.I., red.; SHUSTER, Ya.S., tekhn.red.

[Principal manifestations of the side effects of antibiotics in
the clinic] Osnovnye proiavleniia pobochnogo deistviia anti-
biotikov v klinike. Tashkent, Gos.med.izd-vo M-va zdravookhra-
neniia UzSSR, 1960. 255 p.   (MIRA 14:3)
                    (ANTIBIOTICS)

ASKAROV, A. *., prof.; SULEYMANOVA, G.S., prof.; ASKAROV, U.A., kand. med. nauk

Dynamics of clinical, biochemical and cytological changes
in the liver in heliotropic toxicosis treated by dry plasma
transfusions. Med. zhur. Uzb. no.9:8-12 S '62.

(MIRA 17:2)

1. Iz kafedry fakul'tetskoy terapii Tashkentskogo gosu-
darstvennogo meditsinskogo instituta, Uzbekskogo instituta
gematologii i perelivaniya krovi i Instituta krayevoy
eksperimental'noy meditsiny AN UzSSR.

ASKAROV, U.A., kand. med. nauk

Bacterial superinfection of the intestines as a complication
of antibiotic therapy. Med. zhur. Uzb. no.9:36-40 S '62.
(MIRA 17:2)

1. Iz kafedry fakul'tetskoy terapii (zav. - prof. A.A. Askarov)
Tashkentskogo gosudarstvennogo meditsinskogo instituta i
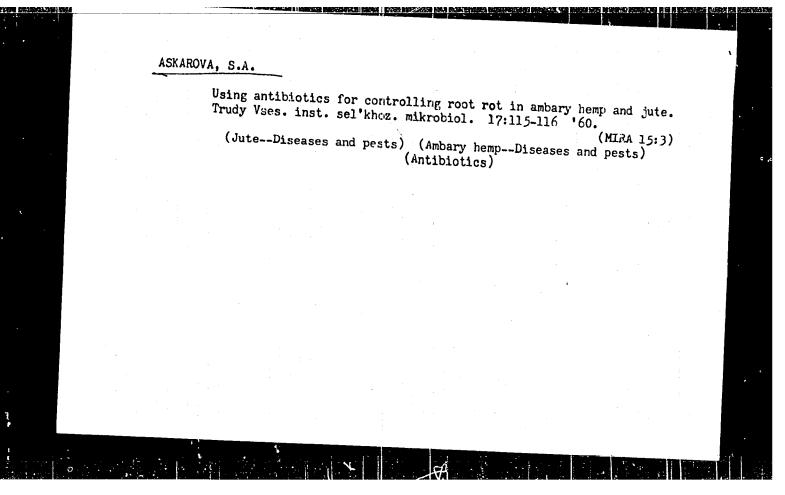Instituta krayevoy eksperimental'noy meditsiny AN UzSSR.

ASKAROVA, S.

Gummosis

Control of gummosis in cotton with the aid of antibiotics. Khlopkovodstvo No. 5,
1951.

Monthly List of Russian Accessions, Library of Congress, June 1953. Uncl.

ASKAROVA, S.

ASKAROVA, S., KRASIL'NIKOV, N. A. , MIRZABEKIAN, R. O. "Utilization of Antibiotics in Some Diseases of Plants (Pseudomonas malvarearum, Bacterium armeniaca, and Pseudomonas citriputeale)," Doklady Akademii Nauk SSSR, vol. 79, August 21, 1951, pp. 1025-1027. 511 P444A
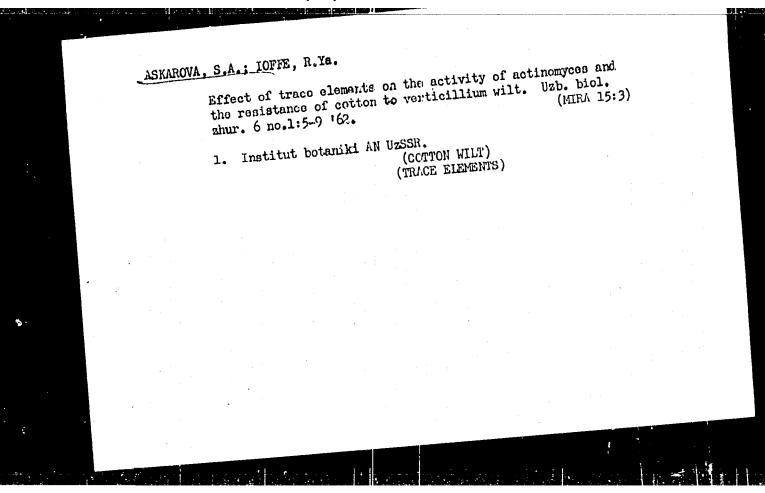
SO: SIRA SI - 19-53, 15 December 1953

ASKAROVA, S.
   b.
   bp.
   d.

I

II Associated, Institute of Microbiology, DBS, AS/USSR

III

IV Was to defend dissertation for degree of Candidate of Biological Sciences before
   INMI 14 Mar 53. "Actinomycetes Antagonsts to Psuedomonas malvacearum
   and Their Application to Combat GOMMOZ of Cotton." VechMosk.3Mar53p4

COUNTRY	:	USSR
CATEGORY	:	Plant Diseases. Diseases of Cultivated Plants O
ABS. JOUR.	:	RZhBiol., No. 23 1958, No. 10511
AUTHOR	:	Askarova, S. A.
INST.	:	
TITLE	:	On the Prospects of Using Antibiotics of Microbial Origin in the Control of Cotton Plant Gummosis.
ORIG. PUB.	:	V sb.: Materialy Ob"yedin. nauchn. sessii po khlopkovodstvu. T. 2. Tashkent, Gosizdat UzSSR, 1958, 326-331
ABSTRACT	:	Cotton plant seeds affected with gummosis were treated with antibiotic matter isolated from Actinomyces. In the majority of the experiments, the effectiveness of this seed treatment was higher than that of the method of wet process of treatment with formalin used in production, and almost the same as the effectiveness of treatment with the dry preparation of trichlorophenolate of Cu. Capability of the indicated antibiotics to retard the appearance of the leaf, stem and boll forms of gummosis, and in some cases to eliminate the disease completely, is pointed out. --Ye. S. Arutyunyan
CARD: 1/1		13

ASKAROVA, S.A.

Use of antibiotics in the control of gummosis in cotton in Uzbekistan. Trudy Vses. inst. sel'khoz. mikrobiol. 17:51-59 '60.
(MIRA 15:3)

(Uzbekistan--Cotton--Diseases and pests) (Antibiotics)
(Gummosis)

ASKAROVA, S.A.

Using antibiotics for controlling root rot in ambary hemp and jute.
Trudy Vses. inst. sel'khoz. mikrobiol. 17:115-116 '60.

(Jute--Diseases and pests) (Ambary hemp--Diseases and pests)
(Antibiotics)

(MIRA 15:3)

ASKAROVA, S.A.; IOFFE, R.Ya.

Effect of trace elements on the activity of actinomyces and
the resistance of cotton to verticillium wilt. Uzb. biol.
zhur. 6 no.1:5-9 '62.   (MIRA 15:3)

1. Institut botaniki AN UzSSR.
                              (CCTTON WILT)
                              (TRACE ELEMENTS)

NIKOLYUK, V.F., doktor biol. nauk, otv. red.; ASKAROVA, S.A.,
        kand. biol. nauk, otv. red.; REZNIKOVA, F.L., red.;
        SPEKTOR, L.Ye., red.; KARABAYEVA, Kh.U., tekhn. red.

[Soil and agricultural microbiology] Pochvennaia i sel'-
skokhoziaistvennaia mikrobiologiia; materialy. Tashkent,
Izd-vo AN Uzb.SSR, 1963. 330 p.   (MIRA 16:11)

1. Konferentsiya po sel'skokhozyaystvennoy i pochvennoi
mikrobiologii, Tashkent, 1961.
        (Agricultural microbiology--Congresses)

ASKAROVA, S.A.; IOFFE, R.Ya.

    Possibility of the use of the fungicidal antibiotic tricho-
    thecin in the control of cotton wilt. Antibiotiki 7 no.10:
    929-930   0'62   (MIRA 16:12)

    1. Institut botaniki AN Uzbekskoy SSR.

ASKAROVA, S.A.; IOFFE, R.Ya.; IKRAMOVA, R.B.

Possibility of using actinomycetes-antagonists in controlling the causative agent of verticilliosis in cotton. Uzb. biol. zhur. 8 no.6:16-19 '64.

(MIRA 18:3)

1. Institut botaniki AN UzSSR.

AKHMEDOVA, L.; ASKAROVA, S.A.

Distribution of actinomycetes in the hydromorphic soils of
Uzbekistan. Uzb. biol. zhur. 9 no. 6:16-19 '65 (MIRA 19:1)

1. Institut botaniki AN UzSSR. Submitted September 21, 1964.

POTLAYCHUK, V.I., kand.sel'skokhoz.nauk; SOLOMAKHINA, V.M., kand.biolog.nauk; SEMAKOV, V.V., nauchnyy sotrudnik; NELIN, Ye.S., nauchnyy sotrudnik; MOROZOVA, A.T., assistent; MALININ, V.M.; KOROL', A.P.; BYKOVA, Ye.P., mladshiy nauchnyy sotrudnik; CHKHUBIANISHVILI, TS.A., mladshiy nauchnyy sotrudnik; ASKAROVA, S.A., kand.biolog.nauk; IOFFE, R.Ya., kand.sel'skokhoz.nauk

Brief information. Zashch.rast. ot vred. i bol. 9 no.11:51-53 '64.

(MIRA 18:2)

1. Vsesoyuznyy institut zashchity rasteniy (for Potlaychuk, Bykova). 2. Kiyevskiy universitet (for Solomakhina). 3. Kamchatskaya sel'-skokhozyaystvennaya opytnaya stantsiya (for Semakov). 4. Biologo-pochvennyy institut Dal'nevostochnogo filiala Sibirskogo otdeleniya AN SSSR (for Nelen). 5. Luganskiy sel'skokhozyaystvennyy institut (for Morozova). 6. Zaveduyushchiy Izbaskentskim entomo-fitopatolo-gicheskim uchastkom (for Malinin). 7. Zaveduyushchaya Tashkent-skoy tekhnologicheskoy laboratoriyey (for Korol'). 8. Gruzinskiy institut zashchity rasteniy (for Chkhubianishvili). 9. Institut botaniki AN Uzbekskoy SSR (for Askarova, Ioffe).

ACC NR: AR6031735   SOURCE CODE: UR/0299/66/000/009/B070/B070

AUTHOR: Akhmedova, L.; Askarova, S. A.

TITLE: Antagonistic properties of Actinomycetes isolated from hydromorphic soils in Uzbekistan when used against cotton pests

SOURCE: Ref. zh. Biologiya, Part I, Abs. 9B432

REF SOURCE: Sb.Vopr. mikrobiologii. Tashkent, Nauka, 1966, 67-72

TOPIC TAGS: soil science, soil bacteriology, antibiotic, microbe antagonist, soil, MICROBIOLOGY, PESTICIDE

ABSTRACT: Of 1557 strains of Actinomycetes isolated from Uzbek soils, most of those separated from hydromorphic soils were effective against *Staph. aureus, Bact. coli, V. dahliae* and *Fusarium vasinfeotum,* as well as other species.   [WA-50; CBE No. 12]

SUB CODE: 06/ SUBM DATE: none/

Card 1/1   UDC: 615.779.9

ASKAROVA, Ya.N., kand.meditsinskikh nauk

Results of decontaminating of the Ufa water supply with ultraviolet
rays using an AKKh unit. Gig. i san. 25 no. 5:102 My '60.

(MIRA 13:10)

1. Iz Bashkirskogo meditsinskogo instituta.
        (UFA—WATER—PURIFICATION)
      (ULTRAVIOLET RAYS—INDUSTRIAL APPLICATIONS)

L 39685-65   EWG(j)/EWT(m)/FCC/T   [JP(c)   RB
ACCESSION NR: AP5008765   S/0056/65/048/003/0988/0990

AUTHOR: Askar'yan, G. A.

TITLE: Coherent radio-frequency radiation from cosmic showers in air and in dense media

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 3, 1965, 988-990

TOPIC TAGS: cosmic radiation, cosmic shower, cosmic radio wave, Cherenkov radiation, coherent cosmic radio wave

ABSTRACT: Analysis of coherent radiation from cosmic showers indicates that it is possible to record the showers on the basis of surges of the radio-frequency radiation. Given small Cherenkov angles (as in the air), the conditions of coherence are fulfilled even for wavelengths much less than the dimensions of the particle bunch in the shower. The maximum coherently radiating frequencies corresponded to a wavelength of about 6 m in the air when the radius of the maximum of the effective transverse dimension of the particle bunch was about 30 m. Under average conditions, the radiation power and field strength

Card 1/3

L 39685-65
ACCESSION NR: AP5008765

exceeded the amplitude of the background noise. The antennas do not require a verticle direction, and it is possible to receive radiation diffused by the Earth's surface or reflected from it. This makes it possible to collect signals from large areas and to record radiation from very small point sources. The coherent part of the radiation was found to be preferable for recording rare showers of particles of extremely high energy. In the recording of showers in dense media the shower channels are responsible for bringing the concentrated energy to the active layer, where the radiating shower originates. In the case of internal reception, the active layer may consist of matter which weakly absorbs or diffuses the radio waves (e.g., ice covers, parmafrost layers, dry rock). In the case of external reception, the active layer may consist of matter which permits the radiation to emerge by means of internal diffusion. It is noted that with an increase in the energy of the primary particle the generation of the shower is shifted nearer to the Earth's surface, i.e., toward the denser media.

[FP]

Card 2/3

L 39685-65
ACCESSION NR: AP5008765

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk
SSSR (Physics Institute, Academy of Sciences, SSSR)

SUBMITTED: 08Jan65   ENCL: 00   SUB CODE: AA, EC

X REF SOV: 001   OTHER: 001   ATD PRESS: 3229

Card 3/3

ASKAR'YAN G. A.

USSR/Nuclear Physics - Meson shell

FD-723

Card 1/1   : Pub. 146-11/18

Author   : Askar'yan, G. A.

Title   : Effect of pulsation of the meson shell of a nucleon on the probability
                  of interaction of particles

Periodical   : Zhur. eskp. i teor. fiz., 26, 751, Jun 1954

Abstract   : Letter to the editor. Flying high-energy nucleons should reveal
                  "semi-transparency" of nucleons which is connected with the pulsation
                  of the meson shell surrounding a "simple" nucleon. Therefore for the
                  computation of results of some ultrarelativistic processes the mean
                  instantaneous cross sections of interaction should be taken into
                  account. It is possible to study the "meson breathing" of a nucleon.

Institution   : Physics Institute imeni Lebedev, Acad. Sci. USSR

Submitted   : March 6, 1954

H᠊ᕗKAꝁ'YAN, ᕬ-.A.

USSR/Nuclear Physics - Luminescent counters

FD-2215

~~Card 1/2~~   Pub. 146-2C/25

Author   : Askar'yan, G. A. (Moscow)

Title   : Prospects for the use of impulse multi-grid electron-optical tubes in the
                recording of the tracks of ionizing particles in luminescing media

Periodical   : Zhur. eksp. i teor. fiz. 28, 626-627, May 1955

Abstract   : The present article represents the writer's own abstract of his candidate
                work, which he defended in 1951 in the physical faculty of Moscow State
                University. He notes that the success of the employment of luminescing
                counters in experimental nuclear physics confirms the expediency of
                developing electron-optical recorders of the elementary act of interaction.
                For the evaluation of the possibilities and specific methods he considers
                one of the most promising possible variants of such recorders. The prin-
                cipal part of his recorder is the impulse electron-optical tube of special
                design, supplied with magnetic focussing and intended to amplify the
                brightness of the light image of the particle tracks in the luminophor;
                the tube has a semitransparent photocathode with about 10 close fine-grid
                multiplying emitters, and also has an accelerating anode and fluorescing
                screen placed behind the anode. Three references: I. S. Stekol'nikov,
                Elektronnyy ostsillograf, GEI, 1949; Ye. K. Zavoyskiy et alii, DAN SSSR,
                100, 1955.

ASKAR'YAN, G.A.

FD-2220

USSR/Physics - Ionization

Card 1/1   Pub 146-25/25

Author   : Askar'yan, G. A. (Moscow)

Title   : Gas bubble chamber- a possible recorder of the elementary act of inter-
             action of ionizing radiation with matter

Periodical : Zhur. eksp. i teor. fiz. 28, 636, May 1955

Abstract   : The present article is the author's own abstract of his report delivered
             in 1953 in the Institute of Chemical Physics, Academy of Sciences USSR.
             He claims that experimental attempts (D. Glaser, Phys. Rev. 91, 1953;
             Nuovo Cim., Suppl., 11, ser. 9, 2, 1954) to record the tracks of ionizing
             particles in a superheated liquid do not exhaust all possibilities of
             revealing the tracks in a liquid by the formation of bubbles along the
             traces; e.g. in order to record the tracks of ionizing particles one can
             utilize supersaturated solution of a gas in a liquid: the instantaneous
             supersaturation caused by the rapid drop in the pressure of the gas over
             the surface of the liquid makes the liquid with the gas dissolved in it
             internally unstable relative to the formation of nuclei of a new phase,
             namely gas bubbles.

Institution :   -

Submitted   : October 6, 1954

ASKAR'YAN, G. A.

USSR/Physics - Electric image

FD-2985

Card 1/1   Pub. 146 - 26/28

Author   : Askar'yan, G. A.

Title   : Radiation of an accelerated moving electrical image of a uniformly
              moving charge

Periodical : Zhur. eksp. i teor. fiz., 29, September 1955, 388

Abstract   : Of the extensive class of problems on radiational effects that
              accompany the flight of a charge close to conductive or dielec-
              tric surfaces of arbitrarily assigned shape the writer considers
              the following simplest concrete problem: the calculation of the
              radiation connected with the variation of the image for the case
              of the forward flight of a charge moving with nonrelativistic but
              sufficiently large velocity toward a conductive sphere of radius
              R. Three references: V. L. Ginzburg, I. M. Frank, ibid., 16,
              15, 1946; N. P. Klepikov, Vestnik MGU, 8, 61, 1951; V. L. Ginz-
              burg, Izv. AN SSSR, Ser. fiz., 11, 165, 1947.

Institution :

Submitted   : April 25, 1955

$A \circ \kappa \wedge \kappa' \downarrow \wedge \uparrow \wedge, C \wedge$.

USSR/Radiophysics - Superhigh Frequencies, I-11

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35372

Author: Askar'yan, G. A.

Institution: Physics Institute, Academy of Sciences USSR

Title: Pulsed Coherent Generation of Millimeter Radiowaves by Non-relativistic Electron Clusters

Original
Periodical: Zh. eksperim. i teor. fiziki, 1956, 30, No 3, 584-586

Abstract: A pulsed method is suggested for generation of millimeter waves, using radiation occurring when a metallic or dielectric anticathode is bombarded by electron clusters or when the clusters are repelled by a strong localized field. The advantages of the pulsed method is the possibility of placing the region of action in the focus of a cluster-forming installation. The minimum wavelength depends on the compactness of the cluster at the instant of utilization and can be shifted considerably toward that region in the spectrum, in which the methods of prolonged utilization are little effective. The

Card 1/2

USSR/Radiophysics - Superhigh Frequencies, I-11

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35372

Abstract: advantages of metallic anticathodes are high heat conductivity and electric conductivity and high thermal endurance, while the shortcomings are low efficiency and inconvenient distribution of the radiation. The method of pulsed generation of radiation, occurring when the cluster penetrates in a cavity on the surface of a dielectric that is transparent to millimeter-wave radiation, but having sufficient conductivity for d-c, has a great effectiveness. For example, at electron energies of approximately 30 kev, the total energy of radiation is approximately 9 times greater than for a metallic anticathode. A shortcoming is the limit imposed on the load current. Equations are given for the spectral-angle and spectral distributions of the energy for both types of the radiation.

Card 2/2

Category : USSR/ Nuclear Physics - Instruments and Installations. Methods of   C-2
            Measurement and Investigation

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 285

Author   : Askar'yan, G.A.
Title   : On the Density of the Linear Boiling Up of Superheated Liquid Along
            a Track of an Ionizing Particle.

Orig Pub : Zh eksperim. i teor. fiziki, 1956, 30, No 3, 610-611

Abstract : The average number of bubbles that form per unit length of the particle
            track are calculated under the assumption that a bubble occurs whenever
            two positive ions are formed, the distance between which does not ex-
            ceeding a specified value ("localization interval" $\lambda \sim 10^{-7}$cm), and the
            electrons of which acquire by ionization an energy $\mathcal{E} > \mathcal{E}$ separ i.e., they
            are separated by a sufficient distance. The result here is that the
            average density $\underline{n}$ of the bubbles is proportional to the ionizing capacity
            of the particle and to a certain function of state Φ of the system, which
            function is proportional in turn to $\lambda/\mathcal{E}*3$ separ, where $\mathcal{E}*$ separ is the average
            energy of each ion having a sufficiently remote electron. At $\lambda = 3 \times 10^{-7}$ cm and
            $\mathcal{E}*$ separ 300ev, n $= 30$, with the experimental values ranging from ten to
            100. It is indicated that a gas bubble chamber, proposed by the author earlier
            (Referat.Zhurnal Fizika, 1956, 238) should behave in a similar manner, but
            should operate at lower pressures.

Card   : 1/1

ASKAR'YAN, G.A.

SUBJECT   USSR / PHYSICS
AUTHOR   ASKAR'JAN,G.A.   CARD 1 / 2   PA - 1930
TITLE   On the Problem of the Mechanism of Initiation of the Boiling of
                 Liquid Metastable Systems under the Effect of an Ionizing Radi-
                 ation.
PERIODICAL   Zurn.eksp.i teor.fis,31,fasc.5,897-899 (1956)
                 Issued: 1 / 1957

A certain concentration of homologously charged ions without doubt causes a
microscopic tearing of the liquid which is due to germs, on which occasion the
essential part played by the electric poles of the ions manifests itself not
only by the repulsion of the ions, but also by a binding of ions with molecules.
When computing the number of ions formed by the accumulation of ions in the
oversaturated steam it is assumed on this occasion that the following is suffi-
cient for the initiation of the production of bubbles: In a domain, the dimen-
sions of which are not larger than the localization interval, a certain number
of positively charged ions was created, the electrons of which received a cer-
tain minimum of energy on the occasion of ionization. This minimum energy
characterizes the conditions averaged over all possible configurations, at which
the influence exercised by centers with the opposite charge with respect to the
ions is insignificant, at least while the germs of the cavities are being
formed. It may be assumed with sufficient reliability that the δ-electrons with
low energies, which are the most numerous, make the main contribution towards
production of the fluctuations which interest us in this connection. This

Žurn.eksp.i teor.fis,31,fasc.5,897-899 (1956)   CARD 2 / 2   PA - 1930

facilitates modelling the distribution of non-compensated ions. It is thus possible to assume that a large part of the noncompensated ions is produced near the traces of the δ-electrons of low energy and that the distribution of such ions is similar to a POISSON distribution. The probability of the pro-duction of the required groups resulting under these circumstances per longitu-dinal element of the averaged trace of the δ-electron is explicitly given. By integration over the spectrum of the δ-electron the specific number of bubbles is obtained. Several peculiarities of this process of ion-initiation in some liquids are pointed out. A certain number of bubbles, which in some cases is relatively low, can be produced by local heating caused by nuclear collisions. The average initiation energy in this case obviously does not depend notice-ably on the type of that nucleus which received a momentum on the occasion of a collision.

In the case of an increase of the degree of instability initiation energy di-minishes and gradually different microprocesses begin to take effect, which permits the localization of thermal energy (repeated collisions, transforma-tion of the energy of the excited molecules into kinetic energy of the sur-rounding molecules, etc.). A further example for a possible extension of the range of applicability of the bubble chambers is discussed in short.

INSTITUTION: Physical Institute "P.N.LEBEDEV" of the Academy of Science in the
            USSR

AUTHOR: ASKAR'YAN,G.A.   89-8-11/26
TITLE: The Hydrodynamic Radiation from the Tracks of the Ionizing
                 Particles in the Stable Liquids. (Gidrodinamicheskoye izlucheniye
                 ot trekov ioniziruyushchikh chastits v stabilnykh zhidkostyakn,
PERIODICAL: Russian)
                 Atomnaya Energiya, 1957, Vol 3, Nr 8, pp 152-153 (U.S.S.R.)

ABSTRACT: If an ionizing radiation penetrates the liquid, this is
                 accompanied by an increase of the size of molecules, by micro-
                 explosions, with local heating along the traces of the par-
                 ticle. These processes may lead to the formation of empty
                 places and may be germ cells for the vapor-gase phase. They can,
                 in turn, become centers of hydrodynamic radiation. A mathe-
                 matical formulation is given. (With 1 Slavic Reference).

ASSOCIATION: Not given
PRESENTED BY:
Card 1/1

ASKAR'YAN,G.A.

TITLE
On Some New Possibilities of Determining Ions in Metastable Liquids.
(O nekotorykh novykh vozmozhnostyakh vyyavleniya ionov v metastabil-
nykh zhidkostyakh - Russian)

56-5-42/55

ABSTRACT

In its introduction to the above problem,the paper under review
gives a brief report on the methods employed so far.Then the author
proceeds to investigate a new method for the determination of sing-
le ions;this method is based upon the decomposition of the plural-
component operating liquid in the ion fields.It i s assumed that
the molecules of a substance solved in great quantity (for instan-
ce,of a gas,vapor,or liquid) have a dipole moment which is consi-
derably greater than the dipole moment of the solving liquid.In this
context,the occurrence of strong inhomogeneous electrical fields at
the production of ions leads to a strong change as far as the con-
centration of the mixture in the surroundings of the ions is con-
cerned (local enrichment or quasiliquid complex).If the life span of
the ion exceeds the time required for the creation of the local di-
ffusion-statistical equilibrium,then we have for the local concent-
ration of the mixture in the distance from r the center of the ion
field the following formula:

$$K(r) = n_1/n_f = K(\infty)\exp\left\{\frac{1}{kT}\int_0^{E'(r)} (p_1-p_f)\,dE'\right\}.$$

Card 1/2   In this context,p_1 and p_f denote the effective dipole moments,as

On Some New Possibilities of Determining Ions in
Metastable Liquids.   56-5-42/55

averaged over the direction of the field,of the molecules of the
solved substance and of the solving liquid,respectively,(which,in
general,depend on the field intensity and on the temperature),and
E' stands for the effective electrical field intensity affecting
the molecules.For purposes of illustration,the author of the paper
under review then estimates the order of magnitude of the dimensions
of the zone with sufficient enrichment.If the electrical field in
the zone of enrichment is either sharply weakened or disappears com-
pletely,then we also have a considerable reduction in the attractive
forces affecting the molecules in the zone of enrichment.Then the
quasi-excess -pressure affects the adjoining layers and it is possi-
ble that it contributes to the microscopic disruption of the liquid
and to the production of cavity seeds.If the state is sufficiently
instationary,this leads to the creation of a bubble.This process can
be used not only after previous over-saturation but also at retarded
instationarity of the stat.Finally thepaper under review pionts out
briefly the disadvantages of this method.(No reproduction).

ASSOCIATION   Physical Insitute "P.N.Lebedev",Academy of Science of the U.S.S.R.
PRESENTED BY
SUBMITTED   8.1.1957
AVAILABLE   Library of Congress.
Card 2/2

ASKAR'YAN, G. A.

AUTHOR:
TITLE:

ASKAR YAN, G.A.

Coherent Scattering and Electromagnetic Radiation of a Plasma   56-6-43/56
in a Non-omogeneous Magnetic Field. (Kogerentnoye rasseyaniye i
is lucheniye elektromagnitnykh voln plasncy v neudnorodnom
magnitnom pole, Russian)

PERIODICAL:
Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 6, pp 1576-
1577 (U.S.S.R.)

ABSTRACT:
If a magnetic field is superimposed over a plasma, it changes its
electrodynamic properties as e.g. dielectric transmissivity. The
change depends both on the intensity and the direction of the
magnetic field. If the dimensions of the domain of localization
of a certain type of magnetic field are smaller than the wavelength
of an inciding radiation, the scattering on the plasma particles
is coherent. For this case the winding cross section is given.
(With 2 Slavic References).

ASSOCIATION:
PRESENTED BY: Not given
SUBMITTED:
AVAILABLE: 25.2.1957
Card 1/1   Library of Congress

Askar'yan, G. A.

AUTHOR: Askar'yan, G. A.

89-1-9/29

TITLE: The Axial Stability and Localization of the Bundle of a Quasineutral Plasma Which is Accelerated by Electromagnetic Fields (Osevaya ustoy- chivost' i lokalizatsiya sgustkov kvazineytral'noy plazmy, uskoryaye- mykh elektromagnitnymi polyami).

PERIODICAL: Atomnaya Energiya, 1958, Vol. 4, Nr 1, pp. 71-74 (USSR).

ABSTRACT: The demands mentioned in the title are investigated theoretically for a not screened-off plasma.
For theoretical representation an oscillator model is assumed for the plasma bundle, which conveys a better impression of the behavior of the bundle in electric wave fields. Besides, the equations used for the occurring forces make it possible to take such properties connected with the formation of the plasma into account as occur, e. g., with the superposition of an exterior magnetic field on the anisotropy of the plasma parameters.
The theoretically solved equations also demonstrate the various possi- bilities of regulating axial stability in large domains and with dif- ferent means.
There are 7 references, 5 of which are Slavic.

Card 1/2

'AUTHORS: Askar'yan, G. A., Rabinovich, M. S.   SOV/89-5-6-7/25

TITLE: A Resonance Method of Localizing and Heating the Plasma by
              Variable Electromagnetic Pressure (Rezonansnyy sposob
              lokalizatsii i nagreva plazmy peremennym elektromagnitnym
              davleniyem)

PERIODICAL: Atomnaya energiya, 1958, Vol 5, Nr 6, pp 643-644 (USSR)

ABSTRACT: The resonance-like excitation of the volume oscillations
              of plasma accumulation is to be carried out by means of an
              amplitude-modulating electromagnetic field. In this way
              a pulsed and uniformly distributed pressure is brought to
              bear upon the plasma surface. A modulated isotropic pressure
              acting upon a quasispherical plasma-compression can be
              realized in the following manner:
              a) Shortwave radiation modulated with respect to intensity,
              b) Modulation of a rapidly moving magnetic field,
              c) Superposition of three rapidly varying magnetic fields, etc.
              The average pressure $\bar{P}$ (t) acting upon the plasma surface
              is given by:

$$\bar{P}(t) \approx \frac{\bar{H}^2(t)}{8\,\pi}$$

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A Resonance Method of Localizing and Heating the
Plasma by Variable Electromagnetic Pressure   SOV/89-5-6-7/25

(H = field strength on the surface of the plasma; averaging
is carried out according to a high-frequency cycle).
The excitation of the volume oscillations is then carried out
quickly and effectively if the effective modulation frequency
of the quasiacoustic resonance frequency corresponds to the
radial oscillation of the compression ν_{res}. The latter is
given by:

$$\nu_{res} \approx \frac{u}{2a_o} \sim \frac{1}{a_o} \sqrt{\frac{\varepsilon_T}{A}} \quad \text{megacycles}$$

ε_T = thermal kinetic energy of the plasma ions, A = atomic
weight of the ions, a_o = radius of accumulation.
If it is assumed that in oscillations the principal mass of
the plasma takes part at the same time, the following equation
is obtained for the excitation of plasma-oscillations (written
down in dimensionless form):

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A Resonance Method of Localizing and Heating the
Plasma by Variable Electromagnetic Pressure

$$\frac{1}{\left(\frac{a(t)}{a_o}\right)^2} \cdot \frac{d^2\left(\frac{a(t)}{a_o}\right)}{d\left(\sim \nu_{res}\cdot t\right)^2} = \frac{1}{\left(\frac{a(t)}{a_o}\right)^3 \cdot \gamma} - \frac{P_{ext}}{P_o} \cdot (\tau)$$

This equation c $_\lrcorner$ be solved numerically for various

modulation functions $\frac{P_{ext}}{P_o}(\tau)$

The amount of the coefficient of pressure transformation
(ratio between the maximum pressure used P_{ext} and the
maximum attainable internal pressure P_{max} in the dense
plasma) may be estimated at

$$K_p = \frac{P_{max}}{P_{ext}} = (\gamma - 1) \frac{(K_V - 1)}{\left(1 - \frac{1}{K_V^{\gamma-1}}\right)}$$

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A Resonance Method of Localizing and Heating the
Plasma by Variable Electromagnetic Pressure   SOV/89-5-6-7/25

Here $K_V = \dfrac{V_{max}}{V_{min}}$; V = volume of accumulation, γ = ratio
of the specific heat of the plasma gas.
It must be pointed out that in pulsed dynamic operation the
stability conditions for the formation of plasma are different
than in the case of steady operation.
Furthermore, it must be mentioned that if a plasma is heated
to a high temperature the sudden action of an electromotive
force upon the electrons of a quasineutral plasma causes
intense radial oscillation of the ions. This is manifested
by the fact that ions pass one another at high velocities
near the center. This manner of exciting an ion oscillation
by means of a "superhigh" temperature is an analogue to the
production of "boltanki" (boltanki) of charged particles in
a constant electric field.

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A Resonance Method of Localizing and Heating the
Plasma by Variable Electromagnetic Pressure

SOV/89-5-6-7/25

SUBMITTED: August 5, 1958

Card 5/5

AUTHOR: Askar'yan, G. A.

TITLE: SOV/89-5-6-3/25

On the Behavior of Slight Accumulations of the Plasma in
the Waveguide and Their Interaction With Conductive Walls
(O povedenii malykh sgustkov plazmy v volnovode i vzaimodeystvii
ikh s provodyashchimi stenkami)

PERIODICAL: Atomnaya energiya, 1958, Vol 5, Nr 6, pp 644 - 646   (USSR)

ABSTRACT: The radial forces are theoretically calculated which act upon
slight plasma accumulations in fields of the most simple types
of waves if such accumulations shift to random distances.
Besides, the interacting forces between the accumulation and
the conductive walls are estimated. Attention is drawn to
several possible varieties of the shape of wave guides and
reflectors.
In connection with the behavior of accumulations in a wave-
guide it must be taken into account that for sufficiently
small induced dipole moments in the accumulations their inter-
action with the walls is small in comparison with the effects
produced by the wave field also in the proximity of the walls.
This is the case because the wave effect is linearly propor-
tional and the interactions with the walls are quadratically

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On the Behavior of Slight Accumulations of the
Plasma in the Waveguide and Their Interaction With   SOV/89-5-6-8/25
Conductive Walls

proportional to the small dipole moments.
The total radial forces acting upon the accumulations are
derived for the fields of H_o- and E_o-waves.

Apart from a high-frequency magnetic moment, which is induced
by the wave field, accumulation may possess a slowly varying
magnetic moment of its own, which may be caused by a rest-
current, by an artificially maintained circulating current,
or by the diamagnetism of the plasma. The field of the afore-
mentioned moment may, however, impede the approach of the
accumulation to the walls. It is therefore possible to use
a channel with conductive walls as a plasma conductor for a
plasma-accumulation current (the carrying agent is a magnetic
field).

The following further interactions between accumulations and
the conductive walls are pointed out, viz. the localization of
a current-carrying plasma accumulation by means of concave
metallic surfaces. The induced currents produced in such
surfaces which act as mirrors do not merely exercise a slowing-

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On the Behavior of Slight Accumulations of the
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Conductive Walls

down effect upon approaching accumulations (i.e. they
inductively amplify the current in these accumulations), but
they may also lead to a further constriction in a radial
direction.
Such concentration-reflectors may be used for the localiza-
tion of pulses and for the heating of the incident plasma.
M. L. Levin and M. S. Rabinovich displayed interest in this
work. There are 2 Soviet references.

SUBMITTED: August 5, 1958

Card 3/3

AUTHOR: Askar'yan, G. A.   56-34-4-37/60

TITLE: On the Determination of the Velocity of Ionizing Particles
From the Marking of Their Traces by a High-Frequency Electric
Field (Ob opredelenii skorosti ionizuyushchikh chastits po
markirovke ikh trekov vysokochastotnym elektricheskim polem)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958,
Vol. 34, Nr 4, pp. 1005 - 1007 (USSR)

ABSTRACT: The present paper reports on the elementary theory of the
modulation of the ion density of a trace, it gives an ex-
pression for the interval of the marking of the trace of
fast particles, and it discusses the processes permitting
an increase of the efficiency of this method. The equation
for the increase of the number of free electrons $dn_e/dt =$
$= wn_e - n_e/\tau$ contains the probability $w(t)$ of the increase
in number of the electrons per unit of time as well as the
life τ of the free electrons. Using the solution of this
equation the following expression for the number of ions
formed is immediately obtained:

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On the Determination of the Velocity of Ionizing Particles From the Marking
of Their Traces by a High-Frequency Electric Field

$$n_i = \int_{t^*}^{t} \frac{n_e}{\tau}\, dt = \int_{t^*}^{t} \frac{n_o}{\tau}\left\{ \exp\left[\int_{t^*}^{t} (w - \tfrac{1}{\tau})dt \right] \right\} dt$$

Here t^* denotes the time taken by the free electrons to form,
n_o their initial number per unit of length of the trace. The
function $(w - 1/\tau)$ has the form $p\{f(|E(t)|/p) - 1/\tau\}$, where
p denotes the gas pressure and $E(t)$ the electric field strength.
In this connection the weak dependence of the value τ on the
external field is usually neglected. The function f is ex-
terpolated by a certain exponential function. The periodicity
of the external field permits the formation of the function
$w - 1/\tau$ in a Fourier series: $w - 1/\tau = \sum_{o} a_k \cos 2k\omega\,(t-t_k)$.

The author first deals with the case of damped electron ava-
lanches where $(w - 1/\tau)_{mean\ value} = a_o < 0$ applies. In this case

$$n_i = \int_{t^*}^{t} n_o/\tau \, \exp\left\{ a_o(t - t^*)\right\}\, \exp\left\{ \sum_{1}^{\infty} a_k/2k\omega \left[\sin 2k\omega\,(t-t_k) - \right.\right.$$

Card 2/3 $$\left.\left. - \sin 2k\omega(t^* - t)\right]\right\} dt.$$ This formula can be simplified to

On the Determination of the Velocity of Ionizing Particles From the Marking
of Their Traces by a High-Frequency Electric Field

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$$n_i \simeq \frac{n_o}{\tau |a_o|} \left\{ 1 - \sum_1^{\alpha_i} \frac{a_k}{\sqrt{a_o^2 + 4k^2 \omega^2}} \sin \left[2k\omega (t^* - t_k) + \right. \right.$$

$$\left. \left. + \text{arc tg} \frac{a_o}{2k\omega} \right] \right\}$$

The required high frequency output can be considerably reduced
by applying a quasihomogeneous main field, if this field is
constant during an interval not sufficient for a noticeable
distortion of the trace. There are 2 references, 0 of which
are Soviet.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Inst-
itute of Physics   imeni P. N. Lebedev, AS USSR)

SUBMITTED: December 18, 1957

Card 3/3   1. Particles—Velocity   2. Electric fields—Applications

21(7)
AUTHOR: Askar'yan, G. A.   SOV/89-6-6-8/27

TITLE: Induction Self-acceleration of a Flow of Charged Particles
               (Induktsionnoye samouskoreniye potoka zaryazhennykh chastits)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 6, pp 658 - 660 (USSR)

ABSTRACT: The author of the present "Letter to the Editor" discusses the
               possibilities of an inductive energy transition from the
               magnetic field to electrons, or to charged particles in a plasma
               in general, respectively. The electrons in the plasma current
               of an intensive gas discharge mainly show relatively small
               ordered velocities of motion, they dispose, however, of a con-
               siderable energy source originating from the magnetic field.
               Some processes are then investigated which could make it possible
               to use this energy for accelerating a part of the charged parti-
               cles of discharge, and for attaining considerable pulsed current
               densities. The considerations made by the author are based on
               the assumption that an abrupt decrease of the ordered velocities
               or of the number of electrons occurs in the high-power current
               as a consequence of any dissipative processes in the plasma
Card 1/3   (collisions with ions or molecules, electron capture etc); a

Induction Self-acceleration of a Flow of Charged Particles SOV/89-6-6-8/27

result of this effect is the occurrence of an induction field which accelerates the remaining particles in the plasma. In the inductive transition from energy of the magnetic field the number of current carriers N and the induction L play the main part; the following holds for the total energy of the moving charges: $W = W_{kin} + W_{magn} = W_{kin}(1 + Nr_o L)$ where r_o denotes the "classical radius" of the charge carriers . If $Nr_o L \gg 1$ then the main part of the energy is contained in the magnetic field. Among others the author gives a rough estimation which shows that in a sudden decrease of the current conditions occur which guarantee a continuous acceleration of a part of the electrons. $E_{ind} \approx L_{eff} I_o / \tau$, τ is assumed to be the duration of a sudden change of the current in the circuit. If $L_{eff} \approx 5.10^{-9}$ Henry/cm, $I_o \approx 30$ ka, and $\tau < 10^{-6}$ sec, then $E_{ind} > 100$ v/cm which exceeds the critical field necessary for the ordered acceleration of electrons in a plasma; (in the case of initial energies electrons of some ev and an ion density

Card 2/3 $n \lesssim 10^{14}$ ions/cm^3). The maximum energy which may be consumed

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per electron ($\mathcal{E}_{max} \sim \frac{e}{c} L_0 I_0$) is in this case $\approx$ 5 Mev. There are 5 references, 3 of which are Soviet. A footnote states that this work was completed at the end of 1957.

SUBMITTED: September 27, 1958

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ASKAR'YAN, G.A.

Emission of volume and surface compression waves during the
incidence of electron beam on the surface of a solid medium.
Zhur.tekh.fiz. 29 no.2:267-269 F '59.   (MIRA 12:4)

1. Fizicheskiy institut im. P.N.Lebedeva AN SSSR, Moskva.
              (Electron beams)

21(7)   SOV/56-36-2-44/63
AUTHOR: Askar'yan, G. A.

TITLE: The Acceleration of Charged Particles in Traveling or Standing
               Electromagnetic Waves (Uskoreniye zaryazhennykh chastits v
               begushchikh ili stoyachikh elektromagnitnykh volnakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959,
               Vol 36, Nr 2, pp 619-621 (USSR)

ABSTRACT: It is interesting to investigate the conditions under which
               there is a sufficiently strong single-direction force acting on
               particles in a traveling or in a standing wave. This averaged
               force depends on the resonance properties of the motion of the
               particles (which appear after the superimposition of special
               external fields or by using plasma resonances etc) and on the
               scattering of the transverse momentum of the particles. In the
               general case, the resonance frequency ω_0 and the dissipation

               coefficient γ can be varied in space. If these quantities are
               suitably given, the acceleration of the particles through a
               spatially periodical field of a standing wave does not depend
               on the sign of the charge. An expression is given for the av-

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The Acceleration of Charged Particles in Traveling or Standing Electromagnet-
ic Waves   SOV/56-56-2-44/C

eraged Lorentz (Lorents) force acting upon each charge. The
author first investigates the case in which dissipation pre-
vails over the inertia and resonance factors (which occurs near
resonance). If the losses are caused by radiation, the grouping
of the particles extends the operative range of frequencies. A
further increase of the number of the particles contained in
the cluster diminishes the force which acts upon each particle
of the group. In the opposite case of sufficiently different
frequencies, the acting force is proportional to the dissipa-
tion coefficient. The following conclusion can be drawn from
the above-discussed considerations: The phase shift between the
velocity of oscillation and the electric field of the wave can
be varied by various methods within a wide range. This fact can
be used for an increase in efficiency of acceleration in a
traveling wave and also for the formation of a spatially varia-
ble phasing of the particle vibrations which is necessary for a
through-going (skvoznoye) acceleration in the field of a stand-
ing wave. The simplest way of selecting the spatial variation
of the oscillation parameters can be put into practice by the

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The Acceleration of Charged Particles in Traveling or Standing Electromagnet-
ic Waves

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increase or decrease of the axial magnetic field in those
"four-wave regions" in which the directions or forces of the
breaking up (razgon) must be varied. Analogous methods can be
used for the acceleration of a plasma and also for the de-
celeration and throwing backward of the charged particles
escaped from the accumulating systems.
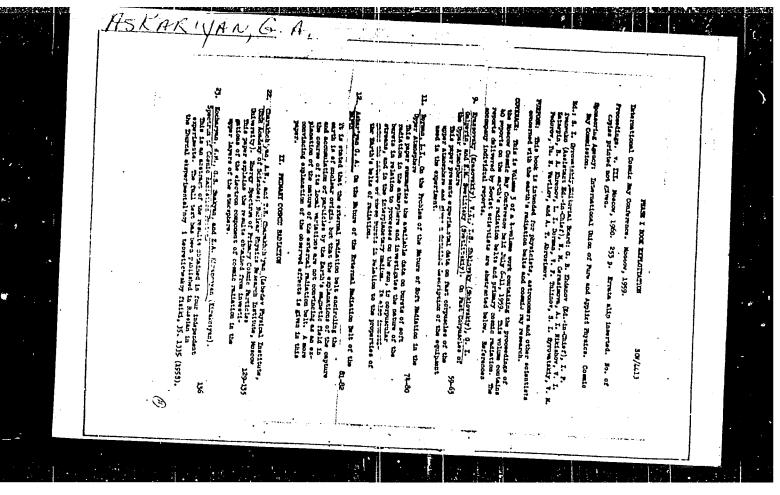
ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
                (Physics Institute imeni P. N. Lebedev of the Academy of
                Sciences, USSR)

SUBMITTED: September 5, 1958

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ASKARIYAN, G. A.

ASKAR'YAN, G. A.

82608

S/056/60/039/01/24/029
B006/B063

9.3700

AUTHOR: Askar'yan, G. A.

TITLE: Electromagnetic Radiation in Electron Diffusion

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki,
             1960, Vol. 39, No. 1(7), pp. 211-212

TEXT: In the paper under abstraction the author studies the emission of
electromagnetic waves during multiple elastic scattering of electrons
produced in an ionized medium. It is shown that wave generation by elastic
collisions is only possible for such electrons (which are captured by the
molecules of the medium only to a small extent), if diffusion occurs, i.e.,
if the mean free path of the electrons becomes somehow larger. This is the
case with a decreasing density of the medium, i.e., during the transition
from a condensed to a compressed-gaseous medium. For this case the author
studies the dependence of the radiation intensity of diffusing electrons
on the pressure in the medium. The number of quanta emitted by an electron
during an elastic collision is estimated to be $\nu \approx \dfrac{r_o}{c} \, \varepsilon \dfrac{\Delta\omega}{\hbar\omega} \dfrac{M}{m}$,

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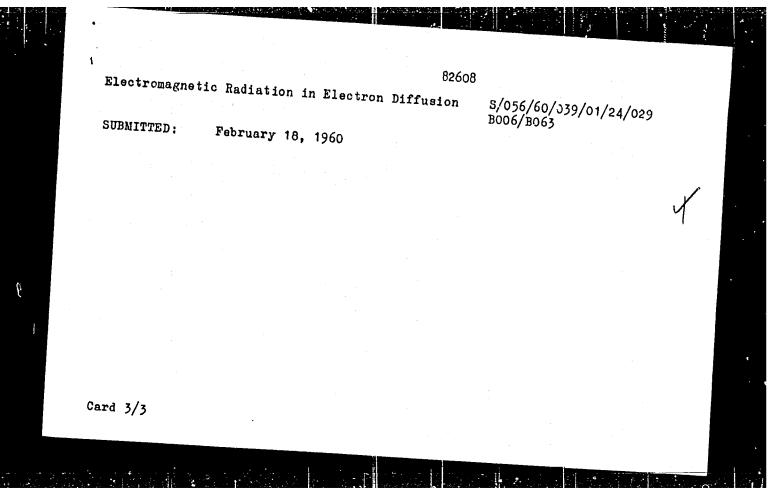Electromagnetic Radiation in Electron Diffusion   82608

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B006/B063

where ε - electron energy, M/m - ratio of molecule mass to electron mass, r_o - classical electron radius. If $\Delta\omega/\omega = 0.5$, $\varepsilon \approx 10$ ev, and $M/m \approx 10^5$ (argon), one obtains $\nu \approx 10^{-2}$ (quanta per electron). A singly-charged relativistic electron produces $n_e \approx 10^4$ electrons/g on its track. Thus, $\nu\, n_e \approx 10^2$ quanta/g, i.e., the radiation of diffusing electrons constitutes an appreciable fraction of luminescence (it is in the order of some per cent of the quantum yield of a good luminophore). Contrary to luminescence, the radiation under consideration has a continuous spectrum, i.e., it exists even in those regions of the spectrum where luminescence is weak or absent. Next, the author discusses a few other details on the occurrence of this radiation and considers various cases in which a consideration of such specific radiation processes might be helpful (analysis of the state and dynamics of electrons, generation of submillimeter waves by exposing matter to light, ionizing particles, strong X-rays, etc.). There is 1 Soviet reference.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Institute of Physics imeni P. N. Lebedev of the Academy of Sciences USSR)

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                                                      B006/B063

SUBMITTED: February 18, 1960

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ASKAR'YAN, G. A.

Cand Phys-Math Sci - (diss) "Increasing the efficiency of plasma
clusters." /Dubna, 1961/ 8 pp; (Joint Inst of Nuclear Studies,
High Energy Laboratory); 160 copies; price not given; (KL, 5-61
sup, 171)

ASKARYAN, G. A.

"Excess Negative Charge of Electron-Photon Shower and the Coherent Radiation
Originating from It. Radiorecording of Showers under the Ground and on the
Moon"

Report presented at the International Conference on Cosmic Rays
and Earth Storm, 4-15 Sep 61, Kyoto, Japan.

P. N. Lebedev Institute of Physics, Academy of Sciences, Moscow, USSR

S/057/61/031/007/004/021
B108/B209

94.2130 (1163,1395,1482)

AUTHOR: Askar'yan, G. A.

TITLE: Radiation of the ionized region in a spark discharge

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 7, 1961, 781-784

TEXT: The author studied the radiation due to plasma inhomogeneity forma-
tion in a constant or quasi-steady magnetic field. In order to describe
the effects arising during a spark discharge, one may use the ideal case of
a conducting spheroid of variable size in an external magnetic field H_0
which does not penetrate into the spheroid. $\vec{M} = -\alpha_m \vec{H}$ is the magnetic
moment of the spheroid (whose axis coincides with the field direction).
$\alpha_m = \frac{V}{4\pi} \frac{1}{1-n}$ is the polarizability, V - the volume of the spheroid, n -
the demagnetization factor which is related to the excentricity e by the
expression $n = \frac{1-e^2}{2e^3} \left\{ \ln \frac{1+e}{1-e} - 2e \right\}$. In the further calculation, the

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Radiation of the ionized region in ...

formulas for a magnetic dipole are used. The spectral distribution of emission is given by

$$d\mathcal{E}_{\omega n} = \frac{1}{c^3} \left| \dot{M}_\omega \right|^2 \sin^2\theta\, d\Omega\, d\omega,$$

where θ is the angle between dipole axis and observer. When the moment varies monotonically with time τ, the radiative energy will be equal to

$$\Delta\mathcal{E} \simeq \frac{1}{c^3} \frac{M_{\infty\tau}^2}{\tau^3} \simeq \frac{1}{c^3} \alpha_m^2 \frac{H_0^2}{\tau^3},$$

When $\dot{M}(\pm\infty) = 0$, then $\ddot{M}_\omega = -i\omega M_\omega$. For $\omega\tau \ll 1$ one obtains $\ddot{M}_\omega \simeq \frac{1}{2\pi} \Delta M$, and thus

$$d\mathcal{E}_{\omega n} = \frac{\omega^2}{8\pi^2 c^3} \left(\Delta M\right)^2 \sin^2\theta\, d\Omega\, d\theta.$$

Besides the radiation related to a widening of ionized substance in a constant field, the splashing of the radiation during rapid ionization of a stationary medium in a variable magnetic field is of great interest. Such

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Radiation of the ionized region in ...

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a field produces currents whose redistribution is determined by the ioni-zation process. For simplicity, it is assumed that the rapidly produced portion of the conductivity $\sigma(\bar{r},t)$ is not too large and that the currents do not screen off the external variable field $H(t)$ too much. When the field is quasi-homogeneous, the induced field is $E = -\frac{\rho}{2c}\dot{H}(t)$. . The magnetic moment of the induced currents is

$$-M_z(t) = \frac{1}{c}\int j\pi_z^z dv = \frac{\pi}{2c^2}\dot{H}(t)\int \sigma(t)p^z dv = \dot{H}(t)\Phi(t),$$

where the function $\Phi(t)$ may have a period that is considerably less than the period of the external alternating field. The results may be used, for instance, to increase the intensity of microwaves emitted from a spark dis-charge by applying a magnetic field to the discharge gap. Analogous ef-fects may appear also on an astronomical scale. Finally, the author thanks Professor M. S. Rabinovich for discussions. There are 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc.

Card 3/4

Radiation of the ionized region in ...   S/057/61/031/007/004/021
                                                 B108/B209

ASSOCIATION: Fizicheskiy institut AN SSSR im. P. N. Lebedeva. Moskva
               (Physics Institute AS USSR imeni P. N. Lebedev Moscow)

SUBMITTED: July 25, 1960

Card 4/4

27164

S/057/61/031/009/004/019
B109/B138 |

24.6740
26.2321

AUTHOR: Askar'yan, G. A.

TITLE: Stabilization of plasmoids

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 9, 1961, 1036-1038 |

TEXT: The author studies some possibilities of plasma confinement by
internal and external magnetic fields. A simple method of preventing
lateral diffusion of plasmoids is the application of an internal and
external longitudinal magnetic field. During deformation, a magnetic
pressure gradient is formed which counteracts the deformation force. De-
formation decreases, as the magnetic field H_o increases. For a radial
transverse bulge, the compensation condition $\Delta P_{\perp} \simeq H_o^2 (1 - a_o^4/a^4)/8\pi$ is
obtained for an initial radius a_o of the plasmoid. In many cases, it is
necessary to eliminate the longitudinal scattering of the plasmoid. If
one refers to a coordinate system in which the plasmoid is at rest, and
brings the inertial force into relation with the pressure gradient

Card 1/2

Stabilization of plasmoids

$\partial P/\partial z = -\varrho a$, one obtains $P = P_0 \exp(-m_i a z/kT_e)$ with $P = \varrho kT_e/m$ under isothermal conditions, where m_i is the ion mass, T_e the plasma temperature, a the plasmoid radius. The effective longitudinal dimension of the plasmoid, therefore, is $\Delta z \sim kT_e/m_i a$. The contraction due to inertia simplifies the assumptions for an acceleration of the plasmoid since special measures for the elimination of longitudinal diffusion become superfluous. Diffusion along the magnetic field and axial instabilities of the position of the plasmoid can be avoided by rotating the magnetic field around the waveguide axis. Finally, the author mentions a method of localizing plasmoids by stray currents based on the appearance of considerable unevenness of the pressure caused by stray currents. There are 6 references: 3 Soviet-bloc and 2 non-Soviet-bloc.

SUBMITTED: July 8, 1960

Card 2/2

26418
S/056/61/041/001/013/021
B102/B214

24.2200

AUTHOR: Askar'yan, G. A.

TITLE: Diamagnetic perturbations in media under the action of
            ionizing radiation

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41,
             no. (7), 1961, 186-189

TEXT: If a medium with high electron concentration is placed in a
magnetic field, there appears in it a diamagnetic moment whose alteration
leads to electromagnetic perturbations. These are studied in the present
paper. The diamagnetism of a medium due to diffusion of free electrons
(produced by ionizing radiation) is studied first. The diamagnetism
arises from the transverse drift of the diffusing electrons under the
action of a Lorentz force. Such an "artificial" diamagnetic medium can
be obtained under laboratory conditions by the action of x-rays. In this
case one obtains for the potential difference at the ends of a coil,
arising from the change in the intensity of x-radiation:

$$\mathscr{E} \approx \frac{v}{c}\,\mu H\pi a^2 = \frac{2\pi^2 v}{c}\,\dot{n}_e\,l_i^2\,r_0 Ha^2 \quad \text{при } l_i < \rho_H.$$

Card 1/4

Diamagnetic perturbations in media ...

26418
S/056/61/041/001/013/021
B102/B214

The numerical values for $\xi \approx 50$ kev in air, $l_s = 10^{-4}\xi^2/P \sim 0.25$ cm, $P = 1$ atm, $n_e \sim 10^4$ electrons/cm^3, $H \sim 10^3$ oe, $\nu \approx 10^3$ (number of turns), radius $a \approx 10$ cm, are: $\xi \approx 10^{-8}/T$ v/sec $> 10^{-2}$v on a change of radiation intensity in a time $T < 10^{-6}$sec. During intense ionization bursts, changes in the local magnetic permeability in the atmosphere are possible which approximate ideal diamagnetism ($\mu = 0$). The diamagnetic perturbations caused by ionization bursts may be accompanied by radio flares. These flares may be used for distance dosimetry or recording of ionization bursts. In a change of the total magnetic moment

$$M(t) = \int_V M_1(t)dV = N_e(t)\frac{\varepsilon_\perp}{H}\frac{l_s^2}{l_s^2 + \rho_H^2},$$

the intensity of radiation is given by $W_\omega\, d\omega = (8\pi/3c^3)|\ddot{M}_\omega|^2 d\omega$, where $\ddot{M}_\omega = -i\omega\dot{M}_\omega$ for $M(\pm\infty) = 0$, or $\ddot{M}_\omega = -\omega^2 M_\omega$ for $M(\pm\infty) = 0$. ρ_H is the radius of curvature of the electron trajectories, $\varepsilon_\perp$ is the part of the kinetic energy of electrons due to motion perpendicular to H, $l_s(\varepsilon)$ is the path length of the electrons before scattering). If the magnetic

Card 2/4

Diamagnetic perturbations in media ...

26418
S/056/61/041/001/013/021
B102/B214

moment M_0 is produced or annihilated suddenly (in a time T such that $\omega T \ll 1$), $W_\omega d\omega = (2\omega^2/3\pi c^3)M_0^2 d\omega$. For ionized air in the Earth's magnetic field ($H \approx 0.3$ oe) one has for the total intensity of the burst: $dW/dt \approx (N_\gamma \cdot 10^{-20})^2$ kw, where N_γ is the total number of γ quanta emitted in the burst. If the specific behavior of the function $M(t)$ is taken into account one obtains the more accurate formula:

$$M_\omega \approx r_0\, l_i^2\, H\, (N_e)_\omega \approx \frac{1}{2\pi}\, r_0\, l_i^2\, H \dot{N}_{\gamma_0} \frac{1}{(i\omega - 1/\tau_e)(i\omega - 1/T)} \cdot .$$

$$W_\omega = \frac{8}{3}\frac{\pi}{c^3}\omega^4 |M_\omega|^2 \approx \frac{2}{3\pi c^3}(r_0\, l_i^2\, H\dot{N}_{\gamma_0})^2 \frac{1}{1+(\omega\tau_e)^{-2}}\,\frac{1}{1+(\omega T)^{-2}} \cdot .$$

If the diamagnetic perturbations caused by a bunch of accelerated electrons in a dense medium, placed in a magnetic field, are destroyed, dW/dt may reach the value ~ 3kw. The ratio of this energy to the bremsstrahlung energy is $W_{\omega\ diam}/W_{\omega\ brems} \sim 3 \cdot 10^{-2}$. The forces due to such diamagnetic perturbations may reach the value of 100 dynes. There are 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The reference to

Card 3/4

Diamagnetic perturbations in media ...

S/056/61/041/001/015/021
B102/B214

the English-language publication reads as follows: M.H. Johnson, B. A. Lippman. Phys.Rev., 119, 3, 1960.

ASSOCIATION: Institut im. P.N. Lebedeva Akademii nauk SSSR (Institute imeni P. N. Lebedev of the Academy of Sciences, USSR)

SUBMITTED: January 21, 1961

Card 4/4

27203

3.2500 (1062, 1395)

S/056/61, - /- 5/028
B125/B13..

AUTHOR: Askar'yan, G. A.

TITLE: Excess negative charge of an electron - photon shower and the coherent radio emission from it

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 2, 1961, 616-618

TEXT: The author examines the electron excess in an electron - photon avalanche caused by involvement annihilation of positrons in flight and by the participation of Copton and δ-electrons in the avalanche. Such an excess can reach 10% of the total number of shower particles at the maximum of the shower. The excess of particles is given by

$$\nu = n_- - n_+ \approx Ce^{-t/\tau_-} + \frac{Ae^{t/T_+}}{1/T_+ + 1/\tau_-} \approx \frac{n_+}{\tau_a(1/T_+ + 1/\tau_-)} \text{ for } t \gg \tau_-.$$

Since $T_+ \sim \tau_-$, $\tau \sim 1_{rad}/c$, and $\tau_a \approx 1/N_e \sigma_a c$, one obtains

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27203

S/056/61/041/002/025/028
B125/B138

Excess negative charge of an ....

$$\frac{\tau}{\tau_a} \sim \frac{137}{4Z} \cdot \frac{mc^2}{E_+} \cdot \frac{\ln(2E/mc)}{\ln(183/Z^{1/3})} \sim \frac{B}{ZE_+}$$. This ratio depends, not on the density

of the medium, but only on its nuclear charge number and on the particle energy. At $Z \approx 10$ and at a mean energy $E \approx 10^8$ ev, for example $\tau/\tau_a \sim 0.1$ is obtained at the maximum of the shower. The existence of a moving non-compensated charge in the shower can increase the intensity of the flares of Cherenkov radiation, bremsstrahlung, or transition radiation in the range of radio waves by many orders of magnitude. In the case of wave lengths greater than cluster dimensions, the radiation intensity is proportional to V^2 which increases with increasing number of shower particles. For this reason it is advantageous to record the radio emission from intense electron-photon showers. For this reason the radio recording of intense electron-photon showers is preferable. The density of the medium determines the dimensions of shower-particle localization of as well as the wave range in which the radiation is coherent. Coherent radio-emission flares occur if a great number of shower particles were produced with an energy at which the annihilation of positrons becomes already noticeable without their range being too small. In air, the dimensions of

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27203

Excess negative charge of an ...   S/056/61/041/002/025/028
                                                     B125/B138

the shower and the lengths of the emitted waves are of the order of
several hundred meters. In dense media, the wavelength of coherent radio
emission ranges from 1 to 100 cm. The recording of flares of radio emis-
sion from showers produced by high-energy accelerator particles or cosmic
rays in blocks of dense matter is of interest. The radiation power depends
closely on the energy E_0 of the primary particle:

$$\Delta J_\omega \approx (e^2 v^2/c)\omega\Delta\omega\sim3(10^{-16}E_0)^2 \cdot mW \; at \; \Delta\omega\sim0.1\omega\sim2.10^9 (\lambda \sim 10 \; cm). \quad For$$

$E_0 \approx 10^{18}$ ev, e.g., the radiation power is $\Delta J_\omega \sim 30$ w. The Cherenkov radia-
tion is more intense in media in which the shower has minimum dimensions.
Other mechanisms underlying the separation of charges in showers are
possible. According to V. I. Gol'danskiy (private communication), coherent
radiation can be produced by polarization of a shower in the earths'
magnetic field. Improved efficiency in recording cosmic-ray particles and
showers of superhigh energies can give valuable information on rare
processes involving extremely high energies in space. This remote-control
method of recording penetrating particles includes a study of the flares
of radio waves from penetrating particle showers underground on the moon

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27203

Excess negative charge of an ...

S/056/61/041/002/025/028
B125/B138

and the earth. The slight attenuation of radio waves, especially in rock salt, marble, granite, etc., their high dielectric constants and the absence of radio-interference at depth will probably permit an efficient recording of easily penetrating cosmic particles (e.g., muons) with the help of the Cherenkov radiation emitted during the penetration of high-energy particles into the ground. Since the moon has no magnetic field and no atmosphere, the generator of radio waves by cosmic particles and showers in the ground must be more intense on the moon. These facts as well as the absence of a Heavyside layer and the pronounced curvature of the moon's surface make possible the recording of radio waves by apparatus landed on the moon since radio communication between two objects on the lunar surface is not possible. There are 4 references: 3 Soviet and 1 non-Soviet. The reference to English-language publications reads as follows: Radio-Electronics, 31, 10, 6, 1960.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
(Physics. Institute imeni P. N. Lebedev of the Academy of
Sciences USSR)

SUBMITTED: March 24, 1961

Card 4/4

28933
S/056/61/041/004/018/019
B111/B112

26.5400

AUTHOR: Askar'yan, G. A.

TITLE: Effect of external fields on the motion and growth of
               bubbles in boiling liquids

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41,
               no. 4, 1961, 1231-1232

TEXT: To study the influence of motion on the growth of bubbles and to
investigate it under very simplified thermodynamical conditions, it is
necessary to prevent rising of bubbles to the surface. A freely "falling"
bubble chamber fulfills these conditions. Thus, it is also possible to
remove convection in liquids and to decrease the track distortion. The
drop distance measured several mm, which corresponds to a drop time of
10^{-2} - 10^{-3} sec. Not only gravity, inertia, and buoyancy are acting on the
bubbles but also those forces of an inhomogeneous, electric, and magnetic
field, which are acting on the dipole moments. The author has studied
only such cases where the bubble dimensions are small compared with the

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Effect of external fields on the motion...

28933
$S/056/61/041/004/018/019$
$B111/B112$

characteristic dimensions of the field change and where the surface pressure exceeds by far the pressure of the electric and magnetic field on this surface. For the steady state the following estimation has been made: $\chi_e \nabla E^2 \sim g$, $\chi_m \nabla H^2 \sim g$, where χ_e and χ_m denote the electric and magnetic polarizability per gram of liquid. It has been established that inhomogeneous fields permit the control of both the bubble growth and the boundary conditions during boiling and heat exchange with the wall. If the bubbles are kept to the vessel wall, then the heat exchange between liquid and wall is impeded; otherwise it is facilitated. Local inhomogeneous fields at the vessel walls can be used to improve the storage conditions of liquid gases, the evaporation control, etc. There are 5 references: 3 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: M. S. Plesset, S. A. Zwick, J. Appl. Phys., 23, 95, 1952; 25, 493, 1954; S. A. Zwick. Phys. Fluids, 3, 685, 1960.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR)

SUBMITTED: April 29, 1961

Card 2/2

26714
S/056/61/041/005/029/038
B102/B138

$\mathcal{26.2331}$

AUTHOR: Askar'yan, G. A.

TITLE: Acceleration of ionized-gas clouds with the intrinsic
               magnetic field scattering an electron the

PERIODICAL: Zhurnal eksperimental'ncy i teoreticheskoy fiziki, v. 41,
               no. 5(11), 1961, 1632 - 1633

TEXT: Acceleration of a plasma with intrinsic magnetic field scattering
an incident electron beam is considered. Due to this field the plasma
becomes opaque for the electrons and their strong scattering (or reflec-
tion) is accompanied by a momentum transfer to the plasma. This acceler-
ation mechanism is opposite to the Fermi mechanism of particle accelera-
tion. A current J of non-relativistic electrons acts upon a magnetic
plasma cloud with force $F \approx m_o v_e J/e$. For $J = 10$ a and an electron velocity
of $v \approx 0.3$ c, $F \approx 10^3$ dynes which may accelerate a plasma mass of
$\approx 10^{-12}$ g $(N \approx 10^{12})$ to 10^6 cm/sec in $\approx 10 \mu$sec. F can be increased by the
multiple reflection of the electrons between two magnetic clouds or a

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Acceleration of...

26714
S/056/61/041/005/029/038
B102/B138

cloud and a magnetic mirror. Another possibility of increasing the effect of the electrons on the plasma is based on the inductive charging of the electrons. Due to the inductance of the incoming flux the total transferable momentum is greater than the mechanical momentum, since the particle mass is increased; $m' = m_0(1 + N_1 r_0 L_1) \gg m_0$. The force becomes $F \sim m_0(1 + N_1 r_0 L_1) v_e J / e \approx L_1 J^2/c^2$ (N_1 - serial number of charges, r_0 classical electron radius, L_1 inductance). For $J \approx 10$ ka, $L_1 \approx 10$, $F \sim 10^6$ dyne. The maximum velocity is given by $u_{max}^2 \approx m' v_e^2/m_i \approx c^{-2} J^2 L_1/m_i N_1$ for $v_i \ll u_{max} \ll v_e$; v_i and v_e are the oriented velocities of ions and electrons, respectively. Momentum transfer to the plasma is realized not only by electron scattering from the intrinsic field but also from in-homogeneities of the external field in the plasma. These acceleration mechanisms may occur not only in plasma accelerators but also in cosmic processes, e.g. near stars in regions with turbulent currents.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences, USSR)

Card 2/1 2

24, 6750

AUTHOR: Askar'yan, G. A.

TITLE: Flight of plasma bunches through magnetic fields (magneto-
              dynamic traps)

TEXT: The stability of a plasma bunch on its flight through a magnetic
field is examined. This field is assumed as a superposition of an axially
symmetric modulated field with the potential

$\Psi_{m0} = H_c z + \dfrac{1}{\alpha_o} H_o I_o(\alpha_o r)\sin \alpha_o z$ and a field rotating about the axis of

motion of the bunch: $\Psi_{m1} = \dfrac{1}{\alpha_1} H_1 I_1(\alpha_1 r)\sin(\varphi - \alpha_1 z)$. Here $I_i(x)$ are

modified Bessel functions. The parameters $\alpha_i = 2\pi/L_i$ which characterize
the spatial period of the field are different in general. The average
radial component of the force compressing the plasma bunch in the trap is

Card 1/2

Flight of plasma bunches ...

$$(F_r)_{av} = - \frac{V}{8\pi} \left[H_o^2 \alpha_o^2 + \frac{1}{4} H_1^2 \alpha_1^2 (3 - M) \right] \frac{1}{1 - M^2} \, r, \text{ where M is the demagnetiza-}$$

tion factor of the spheroidal bunch, V is the volume of the bunch. The same problem is considered for the magnetic field of an axisymmetric H_o-wave also. The pressure exerted by the magnetic field on the surface of the bunch is uniform if $\frac{H_o}{1 - M} = \frac{H_1}{1 + M}$. Such calculations may be useful in the design of plasma conductors.

SUBMITTED: June 9, 1961

Card 2/2

27885

S/056/62/042/005/034/050
B102/B138

34.6720

AUTHOR: Askar'yan, G. A.

TITLE: Cherenkov and transition radiation from electromagnetic waves

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42,
no. 5, 1962, 1360-1364

TEXT: The author discusses a new type of Cherenkov radiation, different
from the possibilities considered up to now. Cherenkov and transition
radiation is emitted, not from a fast charged particle moving through a
medium, but from a front or a cluster of an electromagnetic wave field, i.
e. a three-dimensional wave train propagating as a modulated train with
finite transverse dimensions. The oscillation cluster propagates with
high carrier frequency in a real dispersive medium. The change in average
polarization of the medium, which is caused by changes in amplitude or
frequency of the oscillations, is investigated. It can be shown that in
the edge regions of the cluster the wave field creates an averaged gradient
force (in all cases averaging over the carrier frequency is meant),
which affects the electrons of the medium and polarizes the latter. The
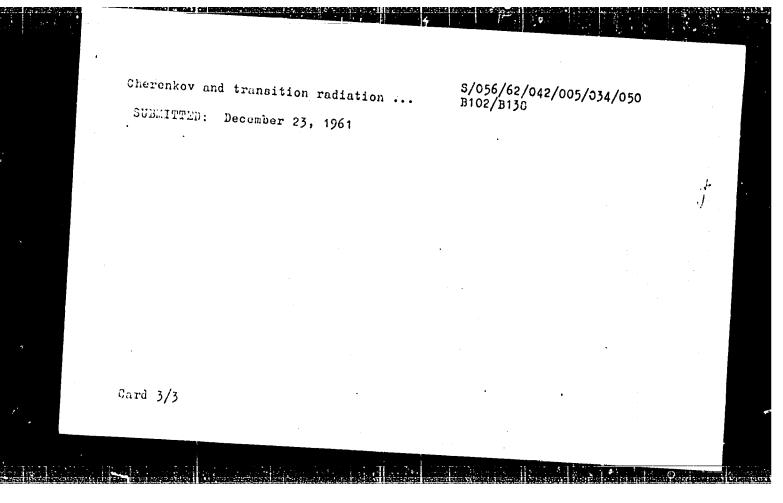
Card 1/3

Cherenkov and transition radiation ...   S/056/62/042/005/034/050
                                            B102/B138

wave cluster becomes surrounded by a skin of polarized medium which moves
together with it, that is,with the wave group velocity. If the group
velocity exceeds the phase velocity of the waves in the frequency
range considered,which is below the carrier frequency, "superlight"
radiation will be emitted at the characteristic Cherenkov angle. A
numerical estimate shows that the emitted power could be high enough to be
recorded, e. g.,$(1- V^2_{ph}/V^2_{gr})\sim1$, a carrier frequency of $\omega\sim10^{15}$ sec^{-1} and
$E_0\sim3\cdot10^7$v/cm, $\Delta W/\Delta L\sim10$ erg/cm. Similar effects should appear when the
wave cluster passes through the interface of two media. Cherenkov and
transition radiation of the type considered here should arise in a wide
spectral range - from radiofrequencies up to gamma quanta. The gradient
force considered is not the only type of nonlinearity which can occur.
Another possibility would be forces arising when the wave field is
scattered from charged particles.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
              (Physics Institute imeni P. N. Lebedev of the Academy of
              Sciences USSR)
Card 2/3

Cherenkov and transition radiation ...   S/056/62/042/005/034/050
                                            B102/B130
SUBMITTED: December 23, 1961

Card 3/3

AUTHOR: Askar'yan, G. A.

TITLE: The effect of a field gradient of an intense electromagnetic
            ray on electrons and atoms

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42,
             no. 6, 1962, 1567-1570

TEXT: An intense transverse inhomogeneity of the field of an electro-
magnetic ray may be used to influence electrons and atoms in a medium.
Electrons and atoms are forced 'out of the ray if the wave frequency
exceeds the natural frequency of electron oscillations, or drawn into it
if the wave frequency is below the natural frequency. Close to resonance
the force acting on any given particle increases sharply, resulting in
either a rarefaction or a concentration of the medium in the ray or in the
radiation focus. The effect may be to cause a pressure drop near the hole
that connects an evacuated vessel with the atmosphere, or to open a
channel through a medium able to conduct charged particles. An electron
plasma can be accelerated and heated by a modulated beam. The thermal,

Card 1/2

The effect of a field...   S/056/62/042/006/023/047
                                          B104/B102

ionizing and separating effects of the ray can be used on the medium to
establish wave-guide conditions of propagation and to eliminate
divergence by self-focusing. A hollow ray may be used to eject or conduct
plasma.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
               (Physics Institute imeni P. N. Lebedev of the Academy of
               Sciences USSR)

SUBMITTED: December 22, 1961

Card 2/2

9,2576 (also 4205)

38372
S/056/62/042/006/040/047
B104/B112

AUTHOR: Askar'yan, G. A.

TITLE: Interaction of the emission from a hole with vibrating surfaces

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki,
            v. 42, no. 6, 1962, 1672-1673

TEXT: Two strong effects exerted by the motion of reflecting surfaces on a radiation field were investigated: (1) the Doppler control of quantum production, and (2) the parametric action of pulsating surfaces on the radiation field. Variations in the conditions of quantum production by optical hole-type generators caused by the motion of the reflecting mirror or of the crystal end, are also studied. It is shown that the accumulation of excited centers is retarded by progressive motion and sudden deceleration of the mirror. This makes it possible to raise the intensity of deexcitation. The action of a vibrating surface on a radiation field is studied for the case of commensurable oscillation and wave frequencies. It is demonstrated that energy is periodically transferred from the field

Card 1/2

Interaction of the emission from ...

S/056/62/042/006/040/047
B104/B112

to the surface and conversely.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
(Physics Institute imeni P. N. Lebedev of the Academy of
Sciences USSR).

SUBMITTED: March 19, 1962

Card 2/2

ASKAR'YAN, G.A.

Reflection of radiation from a moving plasma in a semiconductor
with a current in a magentic field.   Zhur. eksp. i teor. fiz. 43 no.3:
1104-1105 '62.
                                                            (MIRA 15:10)

1. Fizicheskiy institut imeni P.N.Lebedeva AN SSSR.
        (Magnetic fields)   (Plasma (Ionized gases))(Semiconductors)

ASKAR'YAN, G.A.; MOROZ, Ye.M.

Pressure generated by the evaporation of matter in a radiation beam. Zhur.eksp.i teor.fiz. 43 no.6:2319-2320 D '62.

(MIRA 16:1)

1. Institut kristallografii AN SSSR.

(Masers)

AID Nr: 984-22   6 June

DIRECTED COHERENT RADIATION CAUSED BY BREAKDOWN NEAR THE TRACK OF AN IONIZING PARTICLE (USSR)

Askar'yan, G. A.   Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 4, Apr 1963, 1337-1339.   S/056/63/044/004/032/044

A study considers directional emission taking place during breakdown near a particle track in a medium with a near-critical electric field. The emission is coherent and its energy is drawn from the field. The coherent properties arise when, after the passage of the particle through a given point in the medium, the statistical lag of the discharge is small compared to the period of emitted waves (as is the case with plane-parallel spark counters, from which coherent decimeter waves can be expected). The effects can take place in a variety of media, and coherent light as well as coherent microwaves can be emitted in semiconductors. It is shown that a strong asymmetry of emission arises when the velocity of the particle is comparable with or greater than the propagation velocity of radio waves in the medium. The effect can be used to produce pulses of sharply directed radiation and to measure particle velocities.   [BB]

Card 1/1

L 10725-63   EWA(k)/EWT(1)/FBD/T-2/BDS/3W2/EEC(b)-2/ES(t)-2   AFFTC/
ASD/ESD-3/RADC/APGC/AFWL   P1-4/Pc-4   IJP(C)/WG/K/JHB/EH
ACCESSION NR: AP3003155   S/0056/63/044/006/2180/2182 85

AUTHOR: Askar'yan, G. A.; Prokhorov, A. M.; Chanturiya, G. F.; 81
Shipulo, G. P.

TITLE: Laser beam in liquid

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 2180-2182

TOPIC TAGS: laser effects, photohydraulic effects, laser beam in
liquid

ABSTRACT: An experimental study of the effects of focused and un-
focused laser beams on liquids had been carried out. A ruby laser with
a beam pulse duration of approximately 1 microsec was used. Bubble
formation due to focused and unfocused beams was observed and photo-
graphed in water. In ordinary tap water the formation of bubbles ceased
with decreased beam intensity, while in gassed water no such decrease
was observed. Special control experiments showed that light scattering

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L 10725-63

ACCESSION NR: AP3003155

takes place on the bubbles and not on inhomogeneities in the liquid. The size of the bubbles and the light scattering parameters were calculated. An oscillographic study of the scattering process showed that scattering changes in time and that the scattering centers increase the scattering effect. Photohydraulic effects occurring during focusing of the beam near or on the surface of a plate immersed in liquid were noted. Explosive local boiling, downward and upward motion of the plate, changes in the nature of the orifice drilled in the plate by the beam, rupturing of the vessel by shock waves, and ejection of liquid from the impact area were also observed. Increases in the absorption of light by the water, brought about through addition of copper sulfate, led to a sharp increase in the intensity of photohydraulic effects. The height of the ejected stream reached one meter, and in some cases almost all the water was ejected from the vessel. "In conclusion the authors express their gratitude to V. S. Zuyev and V. K. Konyukhov for participation in the preliminary experiments with gassed liquids conducted in the summer of 1962."
Orig. art. has: 2 formulas.

Card 2/2   Physics Inst., Academy of Sci.

L 17796-63   EWA(k)/EWT(1)/FBD/BDS/EEC(b)-2/ES(t)-2   AFFTC/ASD/ESD-3/
RADC/APGC/AFWL/IJP(C)/3W2   P1-4/P1-4/Po-4   JHB/WG/K/EH
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TITLE: Emission of radio waves during modulation of an intense
light beam in a medium

SOURCE: Zh. eksper. i teoret. fiziki, v. 45, no. 3, 1963, 643-646

TOPIC TAGS: laser effect, light beam radio emission, intense beam,
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waves, light produced radio emission

ABSTRACT: Emission of radio waves from a modulated intense light
beam in a medium caused by variation of the average nonlinear
polarization of the medium occurring during variation of intensity
or polarization of the beam is the subject of theoretical study.
The effect is evaluated for isotropic media in an external field
and for anisotropic media with ordered atomic fields. For the
case of a constant electric field ($E_0 \sim 10^6$ CGSE) produced by
atomic systems, beam dimension factor $L/R \sim 0.1$, frequency of de-
tected waves $\Omega \sim 2 \times 10^{11}$ sec^{-1}, bandwidth $\Delta\Omega \sim 0.1\,\Omega$, amplitude of

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wave $E_{01} \sim 10^3$ CGSE, beam area $s \sim 1$ cm^2, and polarization factor $\kappa \sim 0.1$. The power obtained (ΔW_0) is ~ 1 w. In the case of an external electric field ($E_0 \sim 10^5$ v/cm) imposed on an isotropic dielectric, the power obtained under the same conditions as in the previous example is ~ 1 μw. In the case of sinusoidal amplitude modulation of the pulse narrow bandwidth emission is produced, facilitating detection conditions. "The author thanks A. M. Prokhorov for his critical comments and discussion of the work." Orig. art. has: 13 formulas.

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